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Epidemiological characteristics and anatomical distribution of glomus tumors: a single-center retrospective study

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ABSTRACT

Aims: Glomus tumors are rare, benign neoplasms arising from the glomus body, primarily found in the extremities. Although their clinical presentation is well-documented, their epidemiological characteristics and uncommon localizations remain subjects of ongoing research.

Methods: This retrospective study analyzed pathologically confirmed glomus tumor cases diagnosed at our institution between 2009 and 2025. Demographic data and anatomical localization were assessed.

Results: A total of 36 patients met the inclusion criteria, with a female predominance (n=19, 52.7%). The mean age at diagnosis was 48.97±14.31 years. Most tumors were located in the upper extremities (n=24, 66.7%), particularly in the digits, while 10 cases (27.8%) involved the lower extremities. Additionally, two rare cases were identified: one in the intergluteal region and another in the back. The fourth to sixth decades of life were the most commonly affected age range (77%).

Conclusion: Our findings align with previous literature regarding the prevalence of glomus tumors in the upper extremities and their higher occurrence in middle-aged individuals. However, rare localizations, such as the intergluteal region and back, highlight the need for a broader clinical perspective when diagnosing unexplained chronic pain. Future multicenter studies with larger cohorts may provide further insights into the epidemiology and clinical spectrum of glomus tumors.

Keywords: Glomus tumor, epidemiology, anatomical distribution, rare localizations

INTRODUCTION

Glomus bodies, small, specialized vascular structures found primarily in the skin, particularly in areas such as the fingertips, toes, ears, and nose.[1] These structures are involved in the regulation of blood flow and thermoregulation, playing a crucial role in maintaining body temperature by controlling the distribution of blood in response to environmental temperature changes.[2] Histologically, glomus bodies consist of arteriovenous anastomoses surrounded by specialized smooth muscle cells and endothelial cells, which allow them to regulate blood flow efficiently. The presence of specialized arteriolar blood vessels that can constrict or dilate in response to thermal stimuli is one of their distinctive features.[3]

Functionally, glomus bodies help protect the body from extreme temperature variations by constricting peripheral blood vessels in cold environments, thereby minimizing heat loss, and conversely, dilating these vessels in response to heat.[4] The importance of glomus bodies in thermoregulation is exemplified in regions of the body that are particularly vulnerable to temperature fluctuations, such as the extremities. Moreover, these structures are thought to play a role in sensory perception, particularly in detecting pain and cold stimuli.[4,5]

Despite their essential role in vascular and thermoregulatory functions, glomus bodies are also prone to abnormal growth, leading to the development of glomus tumors. Glomus tumors were first reported by Wood in 1812, and their histological characteristics were subsequently described by Barre and Mason in 1924.[6] Glomus tumors, though usually benign, arise from the hyperplasia of the smooth muscle and endothelial cells within the glomus body.[6,7] While this rare tumor usually localizes in the extremities, especially the upper extremities, it can also be present in visceral organs such as the lung, intestine and liver.[8]

The exact etiology behind this transformation remains incompletely understood; however, mutations in specific genes have been implicated in the pathogenesis of glomus tumors.[8] These tumors, typically presenting as painful lesions in the dermis, may cause significant discomfort and require surgical intervention. Love and cold sensitivity tests are used for diagnosis. In the Love test, which is commonly used during diagnostic evaluation, pain symptoms worsen when

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localized pressure is applied to the suspected area using a pointed object, such as the tip of a pen or a needle. Another diagnostic method involves assessing cold sensitivity; pain intensifies with exposure to cold and subsides when the area is warmed.[9] The gold standard treatment for glomus tumors is comlete surgical excision.[6]

Given the clinical significance of glomus tumors, understanding their epidemiological patterns is crucial for early diagnosis and effective management. This study aims to conduct a retrospective analysis of patients diagnosed with glomus tumors at our institution, with a focus on demographic characteristics such as patients' age, sex, and the anatomical localization of the tumors.

METHODS

The study was carried out with the permission of Giresun Training and Research Hospital Ethics Committee (Date: 07.02.2025, Decision No: 05.02.2025/07). This study was designed retrospectively. This study was conducted in accordance with the principles of the Declaration of Helsinki, the Good Clinical Practice guidelines, and other applicable laws and regulations. The word "glomus" was searched in pathology reports of the hospital information archive system retrospectively. The reports with diagnosed "glomus tm" were included to the study. The demographic data of patients' were noted. The age, sex, the excisional biopsy site, side if the site is on extremity.

RESULTS

Between 2009 to 2025, 36 patients met the inclusion criteria. Of the 36 patients' 19 were women and 17 were men with the mean age respectively (48.97±14.31, 48.5±12.01, 47.82±16.82). The range age were between 19-83 years. There were 19 left and 15 right side. In the remaining 2 patients, glomus tumors were located in the intergluteal region and back. The localizations of the glomuıs tumors are given in **Figure**.

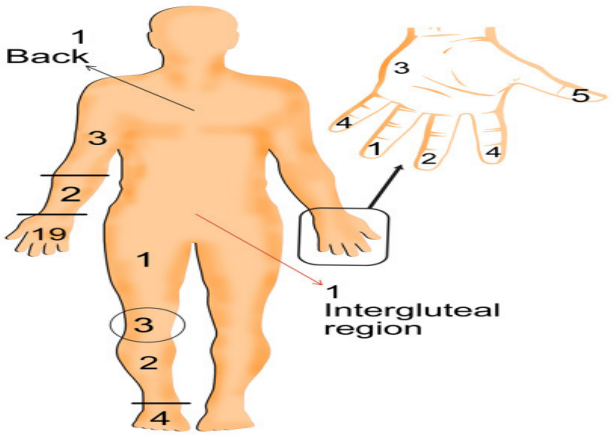

Figure. Anatomical localizations of glomus tumors and their frequency of occurrence

DISCUSSION

The epidemiological findings of pathologically diagnosed glomus tumors in our institution show both similarities and differences when compared to previously published studies. There are reports suggesting that glomus tumors can occur at any age with an equal distribution in young adults, while other studies indicate a higher prevalence in the fourth to sixth decades of life.[8,10] In our study, the majority of cases (77%) were diagnosed in patients within this fourth to sixth decades age range, aligning with the latter observation. In our study, glomus tumor was observed more frequently in women in accordance with the literatüre.[6,11]

A total of twenty-four cases were present at upper extremity and ten patients were present at lower extremity. In additon to the cases at extremites, one case was present at back and one case was prent at intergluteal region that was operated for piloniadal sinus. Regarding anatomical distribution, previous studies have reported that glomus tumors most commonly occur in the fingers of the hands and are more frequently found in the upper extremities compared to the lower extremities.[6,12] Similarly, our study demonstrated that the tumors were predominantly localized in the fingers, with a decreasing frequency observed in the upper and lower extremities.

Among the cases analyzed observed at hand, 84% of the glomus tumors were located in the digits, while 13% were found in the palm. This finding is in accordance with the data reported by Lin et al.[11], who found that 83% of 90 glomus tumors were located in the digits. Additionally, Jawalkar et al.[13] identified the index finger as the most commonly affected digit, followed by the middle finger, thumb, and ring finger. A study from Turkiye found the most affected fingers were index, thumb, middle finger, ring finger and little finger respectively.[14] In contrast, our study found that the thumb was the most frequently affected digit, followed by the little, index, middle, and ring fingers, suggesting that there may be some variability in the distribution of glomus tumors within the hand.

Glomus tumors occurring around the knee are rare, with only 37 cases reported in the literature.[15] Our study contributes three additional cases to this body of knowledge, further supporting the notion that glomus tumors should be considered in the differential diagnosis of periarticular pain.

Moreover, we identified a rare case of a glomus tumor localized in the back. Extradigital glomus tumors have been documented in the literature, including cases on the back, although they remain uncommon.[16] This finding underscores the importance of maintaining clinical suspicion for glomus tumors in atypical locations, particularly in patients with chronic, unexplained pain.

The other rare presentation of the glomus tumor in our cohort was presented at pilonoidal sinus. Glomus tumours may be considered in the differential diagnosis of pilonoidal sinus in a patient presenting with tenderness in the intergluteal region.[17]

The studies demonstrating the anatomical localizations of glomus tumors are rare.[8] According to the literature search, studies from Türkiye typically focus on specific systems, such as the musculoskeletal system, head and neck surgery, and the gastrointestinal system.[18-20] No study from Turkey has been found in the literature that investigates the anatomical localizations of glomus tumors. In this context, the current

study may be the first from Turkiye to examine the anatomical localizations of glomus tumors.

Limitations

This study has several limitations. First, the retrospective nature of our analysis may have led to selection bias, as only pathologically confirmed cases were included. Additionally, the relatively small sample size limits the generalizability of our findings. Our study was conducted at a single institution, which may not fully represent the epidemiological distribution of glomus tumors in broader populations.

CONCLUSION

In conclusion, our findings largely corroborate existing literature regarding the demographic and anatomical distribution of glomus tumors, while also contributing new data on less common tumor localizations. Future studies with larger sample sizes and multicenter data collection may provide further insights into the epidemiology and clinical presentation of this rare neoplasm.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Giresun Training and Research Hospital Ethics Committee (Date: 07.02.2025, Decision No: 05.02.2025/07).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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